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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,115	03/31/2004	Eric J. Strang	251323US6 YA	3706

22850 7590 04/16/2007
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

TUROC, DAVID P

ART UNIT	PAPER NUMBER
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1762

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/16/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/16/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/813,115

Applicant(s)

STRANG, ERIC J.

Examiner

David Turocy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 10-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Applicant's arguments filed 4/3/2007 have been fully considered and are deemed persuasive.

The applicant's arguments against the combination of Chen in view of Wiegand have been deemed persuasive and therefore the rejection to the claims has been withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-8 and 10-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US 2003/0143328 A1) in view of Strang (WO 03/021002).

Chen teaches and plasma ALD process in which a first reactant is continuously fed and a second reactant is pulsed. RF power is also pulsed (figures 6, 7, and 10; paragraphs 55-58). The claimed reactants are taught (paragraph 59). The carrier gases are taught (paragraph 66). The different embodiments of figures 6, 7, and 10 read on the different claimed embodiments of the RF pulse being offset or in sync with the second reactant pulse and having corresponding widths and/or periods.

Chen discloses pulsing RF power and discloses applying an RF power to the substrate support and/or showerhead 170 (0041-0042). Therefore it would have been obvious to one of ordinary skill in the art to pulse RF power to the substrate holder in Chen as shown in the figures because Chen discloses selectively supplying RF power to the substrate support.

Chen discloses pulsing the RF power but fails to explicitly disclose the means of pulsing the RF power. However, Strang discloses pulsing power to a substrate to attract and accelerate ions to the substrate surface through the plasma sheath so that the ions arrive at the substrate moving in a direction substantially normal to the substrate (0008). Strang discloses providing a controller, amplifier, oscillator, waveform signal generator, pulse generator as required by the claims 10-16 (0020-0024). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the method taught by Strang to produce the pulsed RF power required in Chen. By doing so, one would have a reasonable expectation of success, as Strang teaches the art recognized suitability of doing such.

Additionally, taking the references collectively, it would have been obvious to one of ordinary skill in the art at the time of the invention to pulse power to the substrate holder with a reasonable expectation of success to reap the benefits of attract and accelerate ions to the substrate surface as taught by Strang.

With respect to claims 20 and 21, the first and second reactants (the first one being fed continuously and the second being pulsed) are switched. Therefore, Chen

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fails to explicitly teach continuously feeding the metal containing precursor while pulsing the hydrogen reactant. Regardless, Chen does teach that the hydrogen will not react with the metal containing precursor when the RF power is off (paragraph 56). Selection of which material is pulsed and which is fed continuously is therefore arbitrary in terms of the success of the process. Chen bases the selection of pulsing the metal-containing precursor on cost (continuously feeding hydrogen is less expensive than continuously feeding the metal containing reactant). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to continuously feed the metal containing reactant. By doing so, one would have a reasonable expectation of success in situations where cost is not a factor, as Chen teaches that the reactants only react in the presence of the plasma created by the RF power.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

David Turocy
AU 1762



TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER